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| 09/869,410 | 08/31/2001 | Pieter Lykle Buwalda | 294-103PCT/U | 2611 |

7590 10/10/2003

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| EXAMINER |
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LEWIS, PATRICK T

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| ART UNIT | PAPER NUMBER |
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1623

DATE MAILED: 10/10/2003

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/869,410

Applicant(s)

BUWALDA ET AL.

Examiner

Patrick T. Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Applicant's Response dated July 16, 2003

1. In the amendment dated July 16, 2003, claim 21 was amended. Claims 29-34 were added. An action on the merits of claims 21-35 is contained herein.
2. In the amendment dated July 16, 2003, applicant presented arguments directed to the rejections of claims 21-28 under 35 U.S.C. 103(a).
3. Applicant's arguments with respect to claims 21-28 under 35 U.S.C. 103(a) have been considered but are not persuasive. Newly added claims 29-34 are not seen to be patentable over the art of record and will be addressed in new rejections herein below.

Objections/Rejections Set Forth in the Office Action dated January 13, 2003

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seppala et al. WO 97/03120 (Seppala) in view of Hovenkamp-Hermelink et al. Theor. Appl. Genetics (1987), vol 75, pages 217-221 (Hovenkamp) and Bathelaan et al WO 94/24169 (Bathelaan).

Claims 21-26 are drawn to a process for preparing a hydrophobic starch comprising attaching a hydrophobic substituent to the starch by esterification, etherification, or amidation wherein the starch is a root or tuber starch, or derivative thereof wherein said starch is from a plant that has been genetically modified to have

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thereof wherein said starch is from a plant that has been genetically modified to have reduced amylose content, comprising at least 95% amylopectin based on the dry substance of the starch and wherein the reaction utilizes a hydrophobic reagent comprising an alkyl having 7-24 carbon atoms.

Seppala teaches hydrophobic starches which may be derived from potato, wheat, maize, tapioca, rice and similar root or cereal plants (page 15, lines 18-26). The amylopectin content of the starch may be from 0 to 100% (page 15, lines 18-20). The starch is prepared by oxidation, hydrolysatation, cross-linking, cationization, etherfication, or esterfication. The starches are preferably obtained from the esterfication or etherfication of the natural starch with one or several C2-24-carboxylic acids (page 15, lines 28-31; page 16, lines 1-4). Esterfication is also accomplished using acetic anhydride in the presence of a catalyst (page 16, lines 15-22).

Seppala and the instantly claimed invention differ in that Seppala does not teach (1) starches from a plant that has been genetically modified, (2) a process wherein the starch is hydrophobized via amidation, and (3) attaching the hydrophobic group in the presence of a surfactant. However, these deficiencies are taught by Hovenkamp and Bathelaan.

Hovenkamp teaches the isolation of amylose-free starch from mutant potatoes [genetically modified] (page 220, first paragraph). The methodological steps claimed by applicant for preparing a hydrophobic starch are known in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the starch taught by Hovenkamp in the process taught by Seppala. A prima facie case of

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obviousness may be made when chemical compounds [starches] have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." *In re Payne*, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). In the instant case, the starches taught by both Seppala and Hovenkamp have up to 100% amylopectin content.

Bathelaan teaches a method of making amid-modified carboxyl-containing polysaccharides via amidation utilizing long chain primary alkyl amines (pages 12-14, Examples 1-3). Bathelaan also teaches the use of butyl glycol ether [surfactant] to aid in the hydrophobization (page 11, lines 4-7). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the hydrophobicity of starch via amidation and to employ surfactants to promote the reaction since Bathelaan teaches such a process for polysaccharides.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Seppala, Hovenkamp, and Bathelaan and arrive at the instantly claimed invention. One would have been motivated to do so to produce dispersing agents useful for the coatings industry.

6. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seppala et al. WO 97/03120 (Seppala) in view of Hovenkamp-Hermelink et al. Theor. Appl. Genetics (1987), vol 75, pages 217-221 (Hovenkamp).

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Claim 27 is drawn to a hydrophobized amylopectin starch product obtained from a process comprising attaching a hydrophobic substituent to the starch by esterification, etherification, or amidation wherein the starch is a root or tuber starch, or derivative thereof wherein said starch is from a plant that has been genetically modified to have reduced amylose content, comprising at least 95% amylopectin based on the dry substance of the starch and wherein the reaction utilizes a hydrophobic reagent comprising an alkyl having 7-24 carbon atoms.

Seppala teaches hydrophobic starches which may be derived from potato, wheat, maize, tapioca, rice and similar root or cereal plants (page 15, lines 18-26). The amylopectin content of the starch may be from 0 to 100% (page 15, lines 18-20). The starch is prepared by oxidation, hydrolysatation, cross-linking, cationization, etherification, or esterification. The starches are preferably obtained from the esterification or etherification of the natural starch with one or several C2-24-carboxylic acids (page 15, lines 28-31; page 16, lines 1-4). Esterification is also accomplished using acetic anhydride in the presence of a catalyst (page 16, lines 15-22).

Seppala and the instantly claimed invention differ in that Seppala does not teach starches from a plant that has been genetically modified. However, Hovenkamp teaches these deficiencies.

Hovenkamp teaches the isolation of amylose-free starch from mutant potatoes [genetically modified] (page 220, first paragraph). The methodological steps claimed by applicant for preparing a hydrophobic starch are known in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the

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starch taught by Hovenkamp in the process taught by Seppala to obtain the instantly claimed hydrophobic starch. A prima facie case of obviousness may be made when chemical compounds [starches] have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." *In re Payne*, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). In the instant case, the starches taught by both Seppala and Hovenkamp have up to 100% amylopectin content.

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seppala et al. WO 97/03120 (Seppala) in view of Hovenkamp-Hermelink et al. Theor. Appl. Genetics (1987), vol 75, pages 217-221 (Hovenkamp) and Bathelaan et al WO 94/24169 (Bathelaan).

Claim 28 is drawn to a method for thickening a starch solution comprising adding a hydrophobized amylopectin starch product obtained from a process comprising attaching a hydrophobic substituent to the starch by esterification, etherification, or amidation wherein the starch is a root or tuber starch, or derivative thereof wherein said starch is from a plant that has been genetically modified to have reduced amylose content, comprising at least 95% amylopectin based on the dry substance of the starch and wherein the reaction utilizes a hydrophobic reagent comprising an alkyl having 7-24 carbon atoms to a starch solution.

Seppala teaches hydrophobic starches which may be derived from potato, wheat, maize, tapioca, rice and similar root or cereal plants (page 15, lines 18-26). The amylopectin content of the starch may be from 0 to 100% (page 15, lines 18-20). The starch is prepared by oxidation, hydrolysis, cross-linking, cationization, etherification, or esterification. The starches are preferably obtained from the esterification or etherification of the natural starch with one or several C2-24-carboxylic acids (page 15, lines 28-31; page 16, lines 1-4). Esterification is also accomplished using acetic anhydride in the presence of a catalyst (page 16, lines 15-22).

Seppala and the instantly claimed invention differ in that Seppala does not teach starches from a plant that has been genetically modified. However, these deficiencies are taught by Hovenkamp and Bathelaan.

Hovenkamp teaches the isolation of amylose-free starch from mutant potatoes [genetically modified] (page 220, first paragraph). The methodological steps claimed by applicant for preparing a hydrophobic starch are known in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the starch taught by Hovenkamp in the process taught by Seppala. A prima facie case of obviousness may be made when chemical compounds [starches] have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." *In re Payne*, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979).

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In the instant case, the starches taught by both Seppala and Hovenkamp have up to 100% amylopectin content.

Bathelaan teaches a method of making amid-modified carboxyl-containing polysaccharides via amidation utilizing long chain primary alkyl amines (pages 12-14, Examples 1-3). Bathelaan further teaches that the hydrophobic polysaccharides exhibit an improved viscosifying [thickening] effect (page 2, lines 15-20) and may be used as a compatibilizer for starch based polymers (page 11, lines 7-11). It would have been obvious to use the hydrophobic starches as thickening agents since Bathelaan teaches that hydrophobic polysaccharides improve viscosity.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Seppala, Hovenkamp, and Bathelaan and arrive at the instantly claimed invention. One would have been motivated to do so to produce dispersing agents useful for the coatings industry.

Response to Arguments

8. Applicant's arguments filed July 16, 2003 have been fully considered but they are not persuasive. Applicant argues: 1) there is no suggestion or motivation to combine the teachings of the references and 2) there is no evidence that natural starches or polysaccharides have similar properties as root or tuber starches having at least 95 wt.% of amylopectin.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections

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are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In the instant case, the starches taught by both Seppala and Hovenkamp have up to 100% amylopectin content. Both Seppala and Hovenkamp teach starches obtained from potatoes. Hovenkamp further teaches that the amylose-free starch obtained from variant tubers has only 4% of the activity of starch synthase compared to wildtype starch granules (page 219). Applicant's argument that "no evidence has been put forth to support the idea that natural starches or polysaccharides have similar properties as root or tuber starches having at least 95 wt.% of amylopectin, or that the two would be interchangeable" is noted. However, it is noted that the only feature of the starch recited in the claims, other than its source, is the amylopectin content. Since the Office does not have the facilities for preparing the claimed materials and comparing when with prior art inventions, the burden is on applicant to show a novel or unobvious difference between the claimed product and the product of the prior art. See *In re Best*,

562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980).

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35S. , U.S. Code not included in this action can be found in a prior Office action.

10. Claims 29-34 are rejected under 35 U.C. 103(a) as being unpatentable over the combination of Seppala et al. WO 97/03120 (Seppala); Hovenkamp-Hermelink et al. Theor. Appl. Genetics (1987), vol 75, pages 217-221 (Hovenkamp); and Bathelaan et al WO 94/24169 (Bathelaan) as applied to claims 21-28 above (see Objections/Rejections Set Forth in the Office Action dated January 13, 2003), and further in view of Lachocki U.S. Patent 5,563,251 (Lachocki) and Harris et al. U.S. Patent 5,977,348 (Harris).

Claims 29-34 differ from claims 21-28 in that method of attaching a hydrophobic group is limited to etherfication and esterfication wherein the hydrophobic reagent comprises a halide, halohydrin, epoxide, glycidyl or quaternary ammonium.

Although Seppala teaches hydrophobic starches prepared by etherfication, or esterfication, the method of Seppala limits the hydrophobic reagents employed to C2-24-carboxylic acids (page 15, lines 28-31; page 16, lines1-4) or acetic anhydride in the presence of a catalyst (page 16, lines 15-22). The selection of an appropriate hydrophobic reagent in a conventional process is seen to be well within the purview of one of ordinary skill in the art at the time of the invention. Lachocki teaches a process for reacting hydrophilic polyols with hydrophobic epoxy compounds (column 2, lines 14-

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65). Non-limiting examples of such hydrophobic compounds include alpha-olefin epoxy compounds such as hexylene oxide, heptylene oxide, octylene oxide, etc. or glycidyl ethers, such as phenyl glycidyl ether, octyl glycidyl ether, decyl glycidyl ether, epoxides of unsaturated fats, oils, fatty acids, salts or fatty esters, internal-olefin epoxides, cyclododecyl epoxide, etc., branched internal-olefin epoxides, etc. Quaternary substituted epoxides can also be used. Harris teaches conventional modifications of starches (i.e. esterification and etherification) (column 5, lines 40-57; columns 6-8). The derivatizing agents which may be used include any type of organic etherifying or esterifying reagent which is known to react with starch such as ethylene oxide, propylene oxide, butylene oxide, allyl chloride, dialkylaminoethylchloride, or 1-chloro-2-hydroxypropyl trimethylammonium chloride. The selection of a known material based on its suitability for its intended use is indeed *prima facie* obvious.

Conclusion

11. Claims 21-34 are pending. Claims 21-34 are rejected. No claims are allowed.
12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

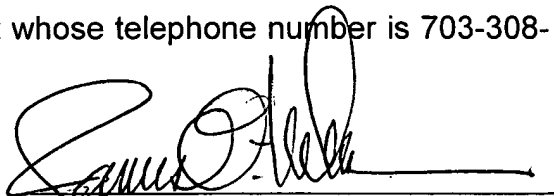
Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick T. Lewis whose telephone number is 703-305-4043. The examiner can normally be reached on M-F 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson can be reached on 703-308-4624. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Patrick T. Lewis, PhD
Examiner
Art Unit 1623



James O. Wilson
Supervisory Patent Examiner
Technology Center 1600

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October 5, 2003